thinks, may form from direct segmentation and fragmentation of nuclei. The large uninuclear giant cells are probably the result of abnormal karyokinesis, and possibly also produced by fusion of a number of single nuclei. Sailer considers that in his case the multinuclear giant cells are apparently aggregations of cells, and many features of my own specimens suggest such an origin. In justice it must be said, however, that identical appearances would be produced by a division of the giant cells into smaller cells, and as a possible confirmation of this view is the much greater frequency of giant cells in the newest parts of the growth. Glockner considers it possible that the giant cells may undergo such a splitting up into small cells. One other source for the giant cells in this case must also be considered. The dura serves not only as a serous membrane, but as a periosteum for the skull, and any tumor arising from periosteum is, of course, especially likely to contain giant cells. In this connection may be recalled the ossified granules previously described. However, giant cells have also been found in endotheliomas not connected with bone—*e. g.*, the pleura, peritoneum, pulmonary vein.

In conclusion, this tumor may be stated to represent a benign growth of the dura mater, derived from the endothelium of the lymphatics of the perithelial layers of the bloodvessels, the periendothelioma of Borrmann. As special structural features may be mentioned the presence of many uninuclear and multinuclear giant cells and spicules of true bone.

GONORRHŒAL MYOSITIS.[1]

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THE earliest reports of the biological history of the gonococcus accorded it merely the rôle of a local parasite whose habitat in the genito-urinary tract was determined by its predilection for the epithelium here found, though long before the day of the specific gonococcus, clinical experience had taught us of the contemporaneous existence of joint inflammations during the gonorrhœa ; yet not till the finding of the gonococcus in the joint secretions by Kammerer, Hartley, and others was the presumed barrier to its growth in tissues other than epithelial broken down. From that time on we have had overwhelming evidence of its ravages, based on its occurrence, in remote parts of the human organism—the heart, nerves (Leyden), and bones (Ullman), and only to be explained by metastasis ; but of very recent date are the clinical observations pointing to its affection of muscles. Such a case came under my care.

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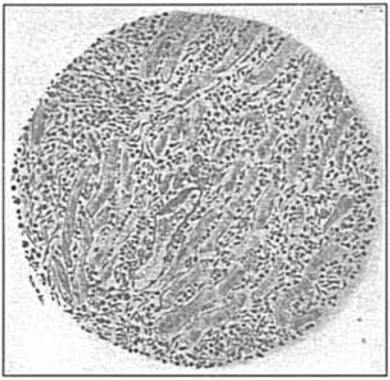
[1] Read before the Genito-urinary Section of the New York Academy of Medicine, April 17, 1901.

A male, aged thirty-five years, otherwise enjoying good health, contracted gonorrhœa two months ago. In the fourth week of its existence he had a chill and fever with pain in the left knee-joint, preventing him from walking, for which he obtained hospital relief. After three weeks of rest he was discharged (no evidence of joint trouble being present). He consulted me for a severe pain about the shoulder-joint. This region showed fulness, no redness, active abduction was impossible, passively it was attended with instant spasm of the abductor group. While ascertaining this an exquisitely tender area was elicited in the group of muscles which make up the posterior axillary fold. By palpation an induration the size of a walnut was felt posteriorly in the muscles, the overlying skin being movable. From the axillary surface nothing could be felt. The daily elevation of temperature was about 100° F. At this stage of the examination the aforementioned history of infection was given, and although the patient subjectively complained of nothing referable to the urethra, yet the glass and Jadassohn tests showed an active posterior urethritis with shreds containing gonococci. Close questioning brought forth an admission of hourly diurnal and three or four nocturnal micturitions. In a few days under expectant treatment (iodine locally) the mass not only grew, but the pain became so intense that I decided to incise in the expectation of giving relief to some pus under tension. Under local anæsthesia I reached the muscles and found them sodden, of a grayish color, and further in depth very friable. No pus was encountered, but a free oozing of turbid serum. Some of the latter material was utilized for bacterial inoculations and cover-glass preparations made. A piece of the muscle was excised.

FIG. 1.

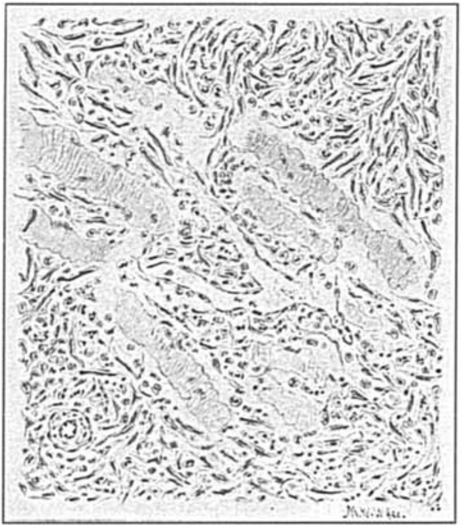


Section of the muscle (3 m.) showing the diffuse extent of the connective tissue proliferation. Ocular 4, objective A A (Zeiss).

The wound was left open to be drained, and as much as six weeks elapsed before its final closure. Though relief from pain followed the incision, subsequently the induration extended, though not in degree involving the whole of the muscle, the latissimus dorsi, to its insertion. When the wound finally closed the area of induration retracted very slowly, and in proportion abduction became more and more possible.

Pathology. The only culture media available at the time were sugar agar and sugar bouillon. Two tubes of each were inoculated and remained sterile in the thermostat at 38° C. The cover-glass smears, of which three were made, showed diplococci (Fig. 4) in but two, and no other micro-organisms. The diplococci found were typical gonococci in arrangement and shape, and furthermore were decolorized according to the Gram stain. They were exceedingly sparse. Their scant number, together with the unsuitable media, may account for the failure of the culture, but, on the other hand, the exclusion of any other pus organism is valuable evidence of a negative kind in favor of the existence of gonococci. The section of the muscle (3 m.) embedded in celloidin shows an exquisite picture of interstitial inflammation (Figs. 1

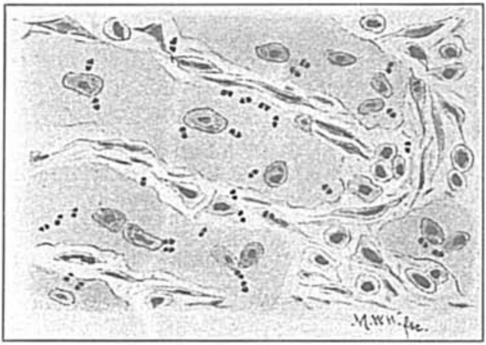
FIG. 2.



Section of the muscle (3 m.) showing the interstitial connective tissue proliferation and cloudy swelling. Ocular 4, objective D D (Zeiss).

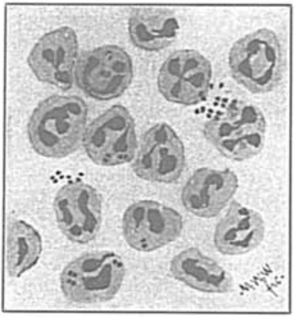
and 2). The muscle fibres in part are the seat of cloudy swelling, yet where they are intact the striations are clearly visible. There is some shrinkage from the perimysium, and the nuclei in places tend to multiply, which may be a sign of regeneration. The connective tissue proliferation is so great as to largely increase the interval between the individual muscle fibres and also to compress them. Sections stained

FIG. 3.



Section of the muscle stained to show the gonococci. Ocular 4, objective $\frac{1}{6}$ (Zeiss).

FIG. 4.



Secretion from the muscle. Gram stain, showing the gonococci.

for gonococci (Fig. 3) show nothing of the muscle structure, but a liberal scattering of diplococci grouped about the nuclei and in the interstices of the muscle fibres. The staining was affected by immersing the specimens for thirty-six hours in a carbolic fuchsin solution in the thermostat. This, on the authority of v. Kahlden, was considered the best procedure, since a prolonged immersion of celloidin specimens in a solution of anilin gentian violet water causes them to be digested.

There are recorded in literature three cases of gonorrhœal myositis based solely on clinical observation. Rona[1] reports two cases. A merchant, aged twenty-seven years, during the course of a chronic urethritis, had pain in the thigh followed by induration the size of a silver dollar. The overlying skin was normal. The induration was very tender, appeared embedded in the fascia, and lasted many weeks. The second case was that of a male, aged twenty-seven years, with fourth attack of gonorrhœa. In the second week of its existence pain at the centre of the left thigh set in, but without fever, yet rest in bed was necessary for two weeks. At the site of pain there existed an infiltration the size of a saucer and very tender, intimately associated with the fascia lata, but in no relation with the overlying normal skin.

Eichhorst[2] reports the case of a male, aged fifty-six years, who had a first attack of gonorrhœa. About the fourth week of its existence he complained of severe pain on the outer aspect of the thigh, and a few days later palpable signs of an induration 8 cm. long and 4 cm. wide set in. The temperature fluctuated between 35° and 38° C. Pains, very severe, lasted a week and then abated, but tenderness to touch persisted. The overlying skin was always normal. The infiltration diminished in extent, but gained in hardness. Lead-water applications were of no avail. Two weeks later the right wrist-joint reddened and became tender and infiltrated. These constitute the only authentic clinically recorded cases in literature, though a case of myositis, the basis of an interesting paper contributed by Treves[3] to the London Clinical Society as myositis of questionable origin in a male afflicted with gonorrhœa seven weeks prior, appears at least to belong here clinically, for such was the opinion of two of the speakers on this occasion. It is likewise probable that a large number of cases of myositis reported in females, classed as pyæmic following the puerperium, rest on a basis of gonorrhœal infection, for such is the contention of Koenig for the postpuerperal arthritis in large number. Eichhorst was not willing, owing to the paucity of observations and the want of pathological proof, to set up a clinical picture, yet this appellation of "sclerosing gonorrhœal myositis" finds justification in the pathological findings for the first time here pictured. The sclerotic process so peculiar to the gonorrhœal process in joints, urethra, and epididymis again manifests itself in the muscles. Bearing on this point is the subsequent course of the new connective tissue formation. In greater part it seems after a variable but usually long period of time to resolve. That the reverse may obtain is gathered from a report by Batut.[1] The latter narrates a case of myositis ossificans of the brachialis anticus in a patient afflicted with gonorrhœa complicated with arthritis. This myositis had its inception in an induration of the entire brachialis anticus. This subsequently became so dense as to intercept the X-rays, and was therefore interpreted as being of bony formation. It was reduced to the size of a nut in four months.

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[1] Rona, S. Ergaenzungsheft 3, Archiv f. Dermatologie und Syphilis, 1892, S. 250.

[2] Eichhorst, H. Deutsch medicinische Wochenschrift, 1899, p. 685.

[3] Treves, F. Transactions of the Pathological Society, London, 1880-1881, vol. xxxii. p. 273.

It was in the expectation of finding pus, inferred from the exquisite localized tenderness and the rise of temperature, that I incised. As already stated, merely a profuse turbid secretion escaped which showed leucocytes exclusively and a very few gonococci. The subsequent protracted course of the inflammation, its spread and eventual retraction point clearly to the futility of the incision in stopping the proliferation, though pain abated instantly. From these half-dozen instances cited, together with the pathological findings in this single case of mine, it is safe to predict that notwithstanding the tendency to resolution some stiffening will eventuate from the residue of connective tissue. Pus formation has not as yet been encountered, and if so it will in all likelihood be traceable to mixed infections.

This location of the gonococcus is explained either as a metastasis in the muscle or as an extension of inflammation from adjoining joints or bones. The latter seems more likely, as in most cases the adjacent joints were affected. That bones can be the seat of a gonorrhœal osteomyelitis, the recent experience of Ullman bears testimony. As in the allied affections muscular rheumatism and myositis ossificans we have found an intimate interdependence of muscle inflammation and the oft associated or preliminary joint symptoms, it is not unlikely, reasoning by analogy, that the primary seat of the metastasis is in the joint or bone, and thence follows by way of the lymphatics the planes of the tissues, preferably the tendons.

The treatment will be largely expectant. For the relief of the pain dry heat, hot salt, or sand bags, as in joint disease, will be found to assuage the pain, aided by local anodynes, guaiacol, gaultheria, and menthol. When the acuity of the process has abated massage is in place. If the intensity of the pain be excessive I believe that an incision will accomplish depletion and relieve tension.

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[1] Batut. Journal des Maladies Cutanees et Syphilitiques, 1900, p. 273.